

ATOMIC ENERGY *newsletter*[®]

A SERVICE FOR INDUSTRY BUSINESS ENGINEERING AND RESEARCH
ROBERT M. SHERMAN, EDITOR. PUBLISHED BI-WEEKLY BY ATOMIC ENERGY NEWS CO., 1000 SIXTH AVENUE, NEW YORK 18, N. Y.

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Dear Sir:

The United States will have an installed nuclear capacity of 1 million electrical kilowatts by the end of 1962, the USAEC's annual report to Congress for 1960 notes in commenting on nuclear progress. Some 23 civilian power prototypes and experiments estimated to cost \$858.4 million were under active design or construction on June 30, 1960 as compared with 18 valued at \$747.1 one year earlier the report observes. The entire reactor program, the report states, has been jeopardized by the court decision invalidating the provisional permit issued by the USAEC for construction of the Enrico Fermi fast-breeder nuclear power plant at Lagoon Beach, Mich. "If the decision is not revised by the Supreme Court, or clarified by new legislation it could be a serious blow to the progress of power reactor development especially with reactors which embody new features," the Commission notes. (Other REPORTS, BOOKS, p.4 this LETTER).

Euratom in association with two German companies will build a nuclear marine propulsion unit. Some \$1.1 million (about 40% of the cost) will be contributed by Euratom. German companies involved are GKSS (Company for Application of Nuclear Energy in Shipbuilding and Ship Propulsion) and Interatom, of Hamburg, a company formed in 1957 by Demag AG of Duisburg and North American Aviation. Working designs for the organic moderated reactor plant are expected to be ready by the end of this year. After completion of designs, testing, etc., a 22,000-ton ship incorporating the propulsion unit will be built at cost of about \$8 million. (Other SHIP REACTOR NEWS, p.5 this LETTER).

Some 56 patented inventions, held by the U.S. Government and developed in the course of nuclear research sponsored by the USAEC have been made available for royalty-free licensing (non-exclusively) by the USAEC. Inventions were issued letters patent from September to December, 1960 and listed in this NEWSLETTER. They bring to 2,494 the total of such patented inventions released for licensing to date. (Other PATENT NEWS, p.4 this LETTER).

New lightweight nuclear thermoelectric generator said to have the highest efficiency of any direct-conversion electrical power device of comparable size and designed and constructed by new products laboratories of Westinghouse Electric Corp., is undergoing performance testing at the Air Force's Special Weapons Center, Albuquerque, N.M. Developed by Westinghouse under an Air Force contract to provide power source for such facilities as unmanned surface radio beacons and weather stations, the generator produces approximately 150 watts of electric power and was designed for one year of continuous unattended operation. Designed to use radio-isotopes such as curium-242, the generator's 144 semiconductive elements are heated by the radioisotope to a temperature of about 1000 deg. F. The ends of the elements farthest from the heat source are kept by finned heat exchangers at a temperature of about 300 deg. F. (Other PRODUCT NEWS, p.3 this LETTER).



ATOMIC ENERGY CONTRACT NEWS...

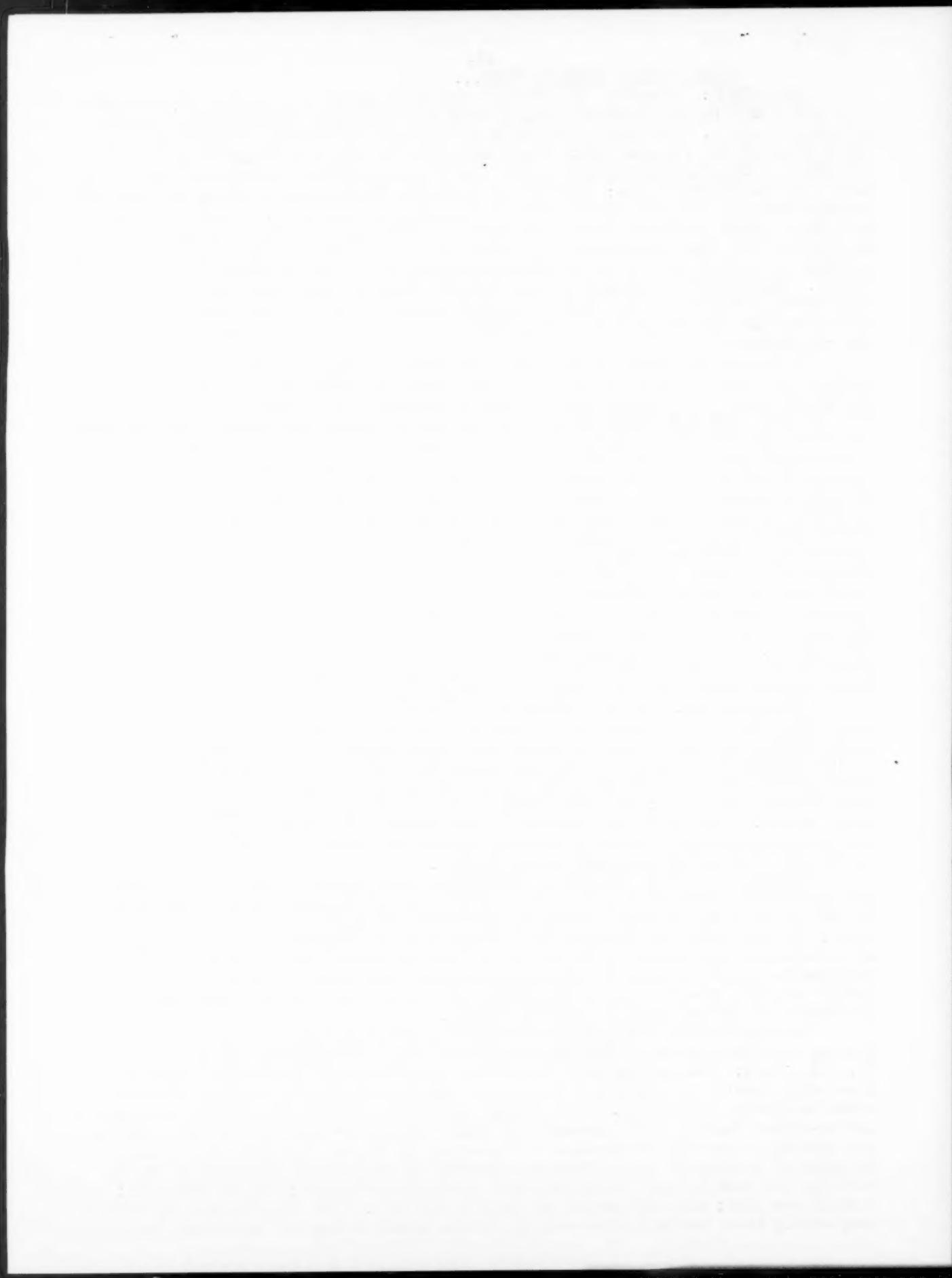
BIDS ASKED: Proposals for research and development of a nuclear rocket engine have been asked by the USAEC-National Aeronautics and Space Administration nuclear propulsion office. The company selected will receive an initial contract for the first phase of the program only. This phase will include assistance to Los Alamos Scientific Laboratory in conducting the Kiwi-B test program; handling the preliminary design of the flight engine; formulating an engine development program; and handling certain research and development work on non-nuclear components. Details of the proposals (which is due no later than April 3, 1961) may be obtained from National Aeronautics and Space Administration, Wash. 25, D.C. (The nuclear rocket propulsion program is handled jointly by the USAEC and NASA, and is administered by the joint office. Experiments completed to date include three nuclear reactors. The last experiment, KIWI-A3, was successfully ground tested by staff of Los Alamos Scientific Laboratory who had designed it. This reactor used high pressure hydrogen gas for its propellant).

Proposals are asked by the USAEC from architect-engineer firms for design and engineering services in connection with the beryllium oxide reactor experiment (BORE) at the Commission's national reactor testing station, Arco, Idaho. The experiment will be concerned with obtaining data on the use of gas-cooled reactors for maritime and other civilian power applications. The USAEC has assigned a program for the construction and test operation of this facility to General Atomic division of General Dynamics Corp., San Diego, Calif. The work will be part of GA's efforts to develop a closed-cycle, gas turbine marine propulsion plant powered by a high temperature, helium-cooled, beryllium oxide-moderated reactor. The reactor will be fueled with a mixture of uranium oxide and beryllium oxide. Conceptual design of the reactor experiment was done by staff of GA. (The core for the reactor experiment is planned to be about 75-in. long by 24-in. in diameter, surrounded by a seven inch thick beryllium oxide reflector. The facility will be designed to permit operating conditions similar to those of the marine propulsion plant under development, including helium outlet temperatures up to 1500 deg. F.; pressures as high as 1120 lbs. per sq. in. absolute; and power levels to 10,000 thermal kilowatts. A low power nuclear assembly, built to study the nuclear characteristics of the beryllium oxide reactor experiment, was completed recently by General Atomic).

CONTRACTS LET: Contract between U.S. Army Corps of Engineers and Alco Products, Inc., has been extended to continue a technical study by Alco of the operation, testing and maintenance of three Army field nuclear power plants. Extension of the service from January 1, through August 31, 1961 is valued at \$174,988. The power plants, known as the SM-1; PM-2A; and SM-1A, are located at Fort Belvoir, Va.; Camp Century, Greenland; and Fort Greely, Alaska. The three were designed by Alco staff people. (The study was started at Fort Belvoir last Summer by an Alco group who are compiling and furnishing written engineered solutions to problems peculiar to the use of field-type nuclear power plants).

Contract has been received by Tracerlab, Inc., Waltham, Mass., from research and development laboratories of the U.S. Army Corps of Engineers to continue research in the use of x-ray Rayleigh scattering phenomena for particular military applications. In the work, the concepts of Rayleigh will be extended to the interaction of x-radiation with matter in an effort to develop specialized instruments. These instruments should be able to identify particular materials in the soil and also permit accurate non-destructive inspection of reactor fuel rods and very small quantities of contaminants in process streams.

Sub-contract to design and manufacture a charge machine for on-stream nuclear fueling has been awarded Baldwin-Lima-Hamilton Corp., Philadelphia, by H. K. Ferguson Co., Cleveland. The machine will be used in connection with the USAEC's experimental gas-cooled reactor in Oak Ridge, Tenn., now under construction there by Ferguson as prime Commission contractor. To cost some \$2,502,625 the 480-ton machine will handle the on-stream fueling under pressure and high temperature conditions. Basic design and specifications for the machine were drawn up by Kaiser Engineers, Oakland, Calif. By means of a group of tools which are rotated, positioned and operated by remote control, the machine can remove radiation protection fixtures; remove used fuel; install new fuel; and replace the protection fixtures. The machine will be able to temporarily store twelve fuel assemblies within itself during the refueling operation.



NEW PRODUCTS, PROCESSES, INSTRUMENTS...

NEW PRODUCTS: Uranium monocarbide, a relatively new high temperature nuclear reactor fuel is now available in laboratory quantities from Vitro Corp. of America, West Orange, N.J. The fuel combines high thermal conductivity, melting point and uranium density with irradiation stability. Process used is a type of gas-fed high-intensity arc system using a nonconsumable anode. The process produces a product in granule or high-density spherical form ranging from 200 mesh to 5/16-in. in size. Vitro points out that fabricators of nuclear fuel elements may realize savings from such shape and size since it eliminates grinding, compressing, high-temperature melting and casting steps.

New series of Geiger-proportional flow counters is being marketed by Tracer-lab, Inc., Waltham, Mass. Available in two sizes, the Model FD-1 (1-in.) and the Model FD-2 (2-in.) will operate in either the Geiger or proportional regions and are made available as window or windowless models. An extremely thin window, less than 125 micrograms per sq. cm., is standard for both the 1-in. and the 2-in. counters. Mylar windows are also available.....A new series of shields for manual and automatic counting is offered by this firm. The new series features a single universal top shield which can be interchanged between the firm's two position manual changer and its three position manual flow counter. Its universal shield will accommodate any of the company's proportional counters, scintillation detectors, etc. Principal features of the shield are said to be its ease of changeability and handling and ability to accommodate a wide variety of detectors.

PRODUCT NEWS: Aluminum welding and brazing alloys Nos. 718, 1100 and 4043 of All-State Welding Alloys Co., White Plains, N.Y., now have nuclear grade certification. Supplied in wire spools and rods cut to length, the alloys may be used in nuclear reactor and radiochemical equipment fabrication. Maximum impurity content is 0.008% lithium, and 0.001% cadmium, boron and cobalt.

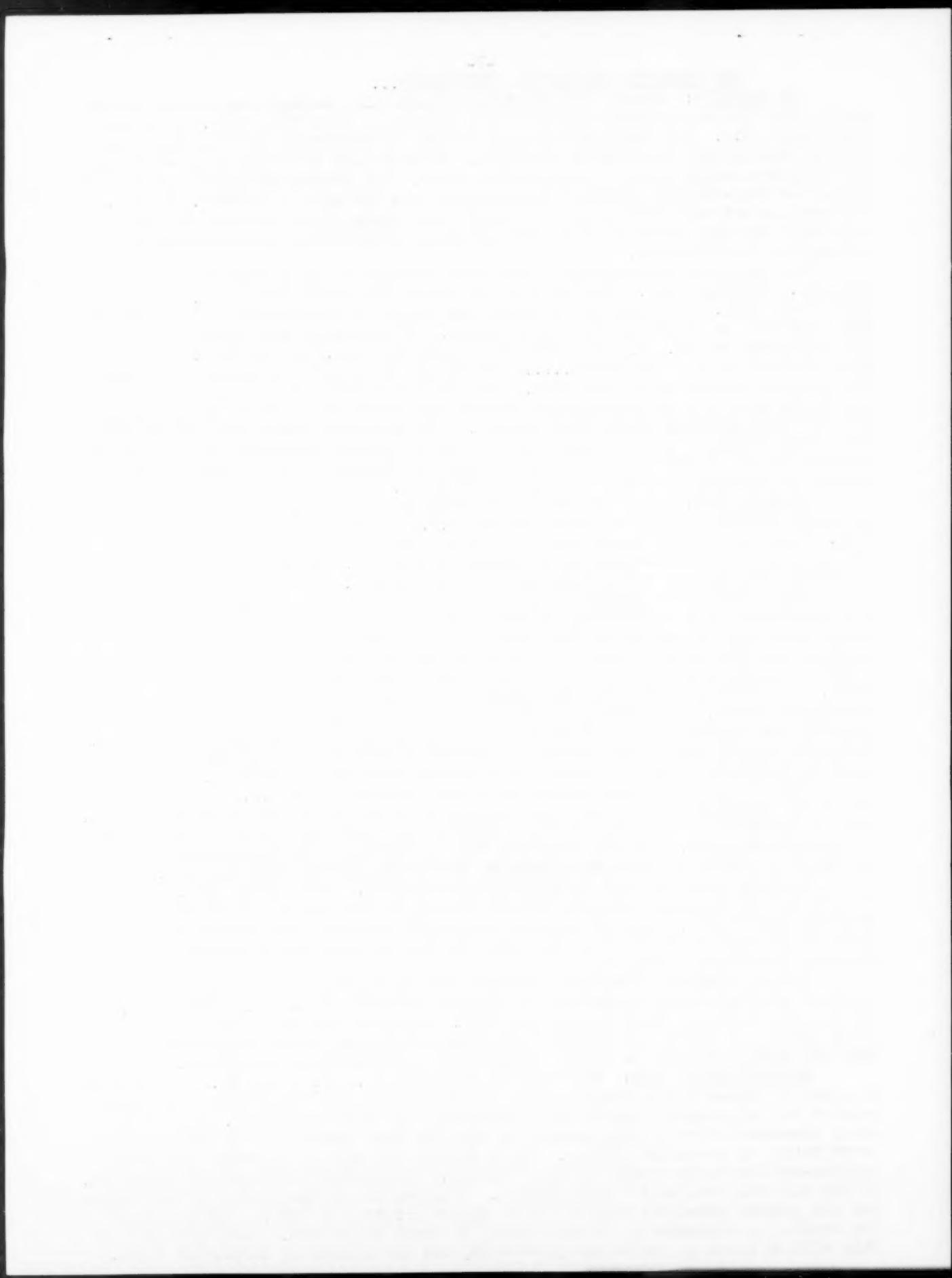
The direct cycle diphenyl reactor can produce electrical energy at costs that are competitive with conventional steam-electric plants in the 5,000 to 20,000 kw range, according to studies of Marquardt Corp., Van Nuys, Calif. The company is handling the work under a USAEC contract. A combined neutron moderator and fuel jacket of graphite is used, giving a high temperature capability for the fuel elements. Its use also lowers the decomposition of the coolant, diphenyl, to almost negligible values. Low vapor pressure of the diphenyl, and its non-corrosive nature simplify the turbine design and permit use of low-alloy steel throughout the plant. Marquardt suggest use of the reactor for marine propulsion, with possible applications in industrial plants to supply both process heat and electricity.

Some 20 kg of enriched uranium have been shipped by the U.S. to France for use in the development of a land-based prototype submarine nuclear propulsion plant. Sale of the material was under contract between the USAEC and France's Commissariat a l'Energie Atomique. The two countries have an Agreement for Cooperation which allows up to 440 kg of enriched uranium to be transferred for such purposes.

Recently shown by High Voltage Engineering Corp., Burlington, Mass., at an exhibit for the American Physical Society meeting in New York was a 160 cm electromagnetic accelerator. Used to separate ultra-pure isotopes, the machine is the first of its type to be built in the U.S. It will be installed at Brookhaven National Laboratory, Upton, N.Y.

Jointly finished rare-earth products will be supplied the nuclear, metallurgical and electronics industries by Michigan Chemical Corp., St. Louis, Mich., and Dresser Products, Great Barrington, Mass. Michigan Chemical, producer of rare-earth metals and oxides and Dresser Industries, metal and cement fabricator, feel that the market can best be served through this combination of facilities.

MANUFACTURERS' NEWS: Mallinckrodt Nuclear Corp., St. Louis, Mo., has received an order to supply 20% enriched uranium for the 15 eMW high temperature gas-cooled reactor for Arbeitsgemeinschaft Versuchsreaktor, Dusseldorf, Germany. One of the chief characteristics of this reactor is that its fuel element are in the form of round balls, or so-called pebbles. These pebbles are made of graphite containing uranium-carbide in the center as fuel material. Mallinckrodt is supplying 325.6-lbs. of 20% enriched uranium for this purpose. Construction of the reactor is now underway and present schedules call for it to become critical in 1963. (Total cost of the reactor is estimated at DM 40 million, or about \$9,600,000. Fifty per cent of this will be borne by the German government, and the balance by industrial firms.)



ATOMIC ENERGY PATENT DIGEST...

PATENTS ISSUED January 31, 1961 to PRIVATE ORGANIZATIONS AND/OR INDIVIDUALS:

(1) Rotating scattering elements for x-ray proof locks. Oleg C. Enikeieff, inventor. No. 2,970,217 assigned to Harry C. Miller Co., Rochester, N.Y. (2) Brick for radiation shields. Frederick A. C. Shaw, inventor. No. 2,970,218 assigned to American Smelting & Refining Co., New York, N.Y.

PATENTS ISSUED January 31, 1961 to GOVERNMENT ORGANIZATIONS: (1) High temperature microscope and furnace. Donald M. Olson, inventor. No. 2,969,712 assigned to USAEC. (2) Electronic multiplier. Dana M. Collier, Leighton A. Meeks, James P. Palmer, inventors. No. 2,969,915 assigned to USAEC. (3) Separation of plutonium ions from solution by adsorption on zirconium pyrophosphate. Raymond W. Stoughton, inventor. No. 2,970,035 assigned to USAEC. (4) Process for removing noble metals from uranium. James B. Knighton, inventor. No. 2,970,050 assigned to USAEC. (5) Nuclear reactors including horizontal graphite bars. Lazare H. Correc, inventor. No. 2,970,097 assigned to Commissariat a l'Energie Atomique, Paris, France.

PATENTS ISSUED February 7, 1961 to PRIVATE ORGANIZATIONS AND/OR INDIVIDUALS:

(1) Radioactivity logging of boreholes. John D. Ball, inventor. No. 2,971,091 assigned to Jersey Production Research Co., Tulsa, Okla. (2) Radiation well logging. James A. Rickard, inventor. No. 2,971,092 assigned to Jersey Production Research Corp., Tulsa, Oklahoma. (3) Well logging. Charles W. Tittle, inventor. No. 2,971,094 assigned to Gulf Research & Development Co., Pittsburgh, Pa. (4) Radiation shielding fabric. Warren W. Drummond, inventor. No. 2,971,095 assigned to Bjorksten Research Laboratories, Inc., Madison, Wisc.

PATENTS ISSUED February 7, 1961 to GOVERNMENT ORGANIZATIONS: (1) Radioactivity monitor. Leslie R. Haywood, inventor. No. 2,971,089 assigned to Atomic Energy of Canada, Ltd., Ottawa, Ontario, Canada. (2) Corrosion reduction. Sherman Greenberg, Robert D. Misch, Westly E. Ruther, inventors. No. 2,970,885 assigned to USAEC. (3) Microwave horns and circuitry for plasma measurements. Charles B. Wharton, Andrew L. Gardner, inventors. No. 2,971,153 assigned to USAEC.

MEETINGS, COURSES, CONFERENCES...

MEETINGS: American Chemical Society's national meeting, March 21-30, 1961 in St. Louis, Mo., will include a one day symposium on nuclear technology.

Annual meeting of the Radiation Research Society is scheduled for May 15-17, 1961 in Washington, D.C. Full information may be obtained from Hymer L. Friedell, School of Medicine, Western Reserve University, Cleveland, Ohio.

CONFERENCES: Aspects of nuclear power plant operation will be covered in papers scheduled for American Power Conference being held March 21-23, 1961 in Chicago. Radioisotopes for Industry conference, co-sponsored by American Nuclear Society and USAEC, is being held February 22-23, 1961 in Pittsburgh.

SYMPORIUM: Symposium on uranium carbides as reactor fuel materials will be conducted April 4, 1961 by the USAEC at the Commission's headquarters in Germantown, Md.

COURSES: Three day series of seminars on pulse height analyzers will be held March 1-3, 1961 by Radiation Instrument Development Laboratory, Inc., Northlake, Ill. Full details may be obtained from J. Johnson, sales manager of the firm which is at 61 E. Borth Ave., in Northlake.

NEW BOOKS & OTHER PUBLICATIONS...

Annual Report to Congress of U.S. Atomic Energy Commission for Year 1960. Atomic energy work in the U.S. for the period. --(\$1.25)....Atomic Energy Research in the Life and Physical Sciences-1960. Special report of the USAEC on basic research in the medical and biological fields and in the physical sciences. (\$1.25) --Superintendent of Documents, Wash. 25, D.C.

Controlled Thermonuclear Research in the Soviet Union. General survey of Russian advances in this field; translation of available literature through June 1959. No. 60-21925. 44 pages. (\$1.75)....Proceedings of the Eighth Conference on Hot Laboratories & Equipment: San Francisco, Calif., Dec. 13-15, 1960. 556 pages. (\$5.75)....Curium Fueled Generators for Lunar and Space Missions. Preliminary safety analysis report. No. MND-P-2366. 49 pages. (\$1.50). --Office of Technical Services, Wash. 25, D.C.



ATOMIC ENERGY BUSINESS NEWS...

REACTOR PROJECTS FOR MERCHANT SHIPS UNDERWAY: Euratom is now negotiating with French Atomic Energy Commission for a gas-cooled ship reactor; with Fiat and Ansaldo of Italy for a light water-cooled type; and with various Dutch organizations for a pressurized-water propulsion plant. The agency is also assisting German companies in ship propulsion efforts (p. 1, this LETTER).

Nuclear development program recommended by Japanese government's Board of Science and Technology provides for construction of nuclear-powered merchantmen. Covering a 20-year period, major goal is installation of nuclear capacity of 1 million electrical kw in next ten years with an increase to 8.5 million electrical kw in the following 10-year period. An extensive research and development program in radiological chemistry and construction of facilities for production of nuclear materials to fulfill Japanese requirements are also proposed.

Stanray Corp., Chicago, received Maritime Commission contract for transportation of spent fuel from the nuclear ship Savannah. Stanray will truck the fuel to reprocessing plants.

URANIUM MINING COMPANY IN EXPANSION MOVE: Denison Mines, Canadian uranium company, which is accumulating substantial amounts of cash in its treasury from its uranium mining operations, has bought outright Lockyear Ready Mix Ltd. The move is part of Denison's plan to invest in basic Canadian industries, president S. B. Roman told the company's annual meeting last week. Mr. Roman noted that the firm's uranium mine and concentrator at Elliot Lake, Ontario, are continuing to operate at full capacity. He noted that the company doesn't know yet if the plant will continue to operate at full capacity throughout 1961.

NEW MANUFACTURING FACILITIES FOR NUCLEAR INSTRUMENT ORGANIZATION: Construction has started on the new manufacturing facilities in Mechlen, Belgium, of Tracerlab S. A., subsidiary of the U. S. company of Waltham, Mass. Tracerlab S. A. was formerly known as Physique Industrielle until its acquisition by Tracerlab in October 1960. The company hopes that the Belgian operation will enable the company to participate in European Common Market activities and otherwise strengthen its marketing position outside the U. S.

NEW NUCLEAR POWER PLANT IN TEST PHASE: Test run of 500 hours duration at full licensed power of 110,000 electrical kilowatts has been successfully completed at the new Yankee Atomic Electric Co. nuclear power plant, Rowe, Mass. The run was started January 17 and was the final phase of the startup testing program which now has been completed. The Yankee plant, New England's first full scale nuclear power station will be limited to its 110,000 kw operation until USAEC-approval is secured to permit operations at the designed capacity of the plant, 136,000 kw.

APPARATUS SALES MADE BY PARTICLE ACCELERATOR MANUFACTURER: A three-stage tandem Van de Graaff 17.5 million electron-volt particle accelerator and a 4 million electron-volt accelerator have been sold by High Voltage Engineering Corp., Burlington, Mass., to the University of Texas. The particle accelerators and related instrumentation which will cost some \$1.8 million will be housed in a new proposed center at the University's main campus in Austin. To use the putputs from these machines to best advantage, the University plans a complex of experimental areas with inter-connecting magnetic deflection, focusing and switching systems to enable the beams of high energy particles to be directed into whichever experimental area is desired. This will permit experimental apparatus to be constructed and tested in one area while an actual investigation is being carried out in another area.

HEARINGS SCHEDULED: Annual review of the "Development, Growth and State of the Atomic Energy Industry" will be conducted by the Joint Congressional Committee on Atomic Energy in six days of statutory hearings (the so-called 202 hearings) February 23, 24, 27, 28 and March 1, and 2. The Committee will hear testimony on materials technology problems in the atomic power industry; findings and recommendations of the McKinney report; USAEC regulatory program and nuclear space program. Full details may be had from the JCAE, Senate Office Building, Washington, D.C.

Sincerely,

The Staff
ATOMIC ENERGY NEWSLETTER